The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 32

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EDWARD BAWOLEK, JEAN-CHARLES KORTA,
WALTER J. MACK, TINKU ACHARYA,
PING-SING TSAI and GREGORY W. STARR

Appeal No. 2003-0261
Application No. 09/126,203

ON BRIEF

Before BARRETT, FLEMING and NAPPI, Administrative Patent Judges.

NAPPI, Administrative Patent Judge.

Decision on Appeal

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 16-39.

The Invention

The invention relates to a method for use in imaging systems. A liquid crystal color shutter is placed in front of an image sensor, see page 9, lines 15-16 of appellants' specification. The shutter provides alterable transmission spectra in different color bands, e.g., red, green blue. The shutter is switched between the different bands to provide the image sensor with light in each band, thus the image sensor generates signals for each color band. The signals from the sensor can then be combined to create a color image, see page 10 of appellants' specification. The signals provided in each band includes an infrared component, see page 11, line 9-11 of appellants' specification. The shutter also includes a "black signal" which blocks the color and includes only the infrared portion of the signal. This black signal is then subtracted from the color signals to produce color signals which do not have an infrared component, see page 11, lines 15-23 of appellants' specification.

Claim 16 is representative of the appellants' invention.

16. An imaging method comprising:

sequentially producing a first output indicative of incident infrared radiation and the absence of incident visible light and a second output indicative of incident radiation in both the visible and infrared spectra; and

subtracting said first and second outputs to produce an output corrected for infrared and dark current noise.

References

Dillon et al (Dillon)	U.S. Patent 4,016,597	April 5, 1997
Yamakawa	U.S. Patent 5,929,432	July 27, 1999 (filed May 29, 1997)
Fontenot et al. (Fontenot)	PCT WO 96/41481	Dec. 19, 1996
Morimoto	JP 6[1994]-105319	April 15, 1994

Sharp, Gary D. et al. (Sharp) "Progress in Field-Sequential Color Shutter Technology" Proc. SPIE Vol. 3031, pages 107-111.

Rejections at Issue

Claims 16, 19, 25, 28 through 32, 35 and 36 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fontenot in view of Yamakawa, Dillon and Morimoto.

Claims 17, 18, 20 though 24, 26, 27, 33, 34, and 37 through 39 stands rejected under 35 U.S.C. § 103 as being unpatentable over Fontenot in view of Yamakawa, Dillon, Sharp et al. and Morimoto.

Opinion

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into

consideration, in reaching our decision, the appellants' arguments set forth in the briefs[1] along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

With full consideration being given to the subject matter on appeal, the examiner's rejections and the arguments of appellants and examiner, for the reasons stated *infra* we reverse the examiner's rejections of claims 16 through 39 under 35 U.S.C. § 103.

Decision

Appellants point out on page 5 of the brief that each claim on appeal requires sequentially providing either an output, or a filtered transmission, or a signal which includes a component of visible and infrared light energies. Appellants argue that the cited references do not teach this limitation. On pages 5 though 8 of the brief appellants provide a comprehensive argument that the color pass filters of Fontenot do not teach passing visible light and infrared.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a ***prima facie*** case of obviousness. ***In re Oetiker,*** 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). ***See also In re Piasecki***, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally

[1]This decision is based upon the Appeal Brief received April 9, 2002 (certified as being mailed on March 20, 2002, in accordance with 37 C.F.R. § 1.8(a)) and the Reply Brief received June 12, 2002 (certified as being mailed on June 5, 2002, in accordance with 37 C.F.R. § 1.8(a)).

available to one of ordinary skill in the art suggests the claimed subject matter. ***In re Fine,*** 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. ***Oetiker***, 977 F.2d at 1445, 24 USPQ2d at 1444. ***See also Piasecki,*** 745 F.2d at 1472, 223 USPQ at 788.

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must necessarily weigh all of the evidence and arguments." ***Oetiker***, 977 F.2d at 1445, 24 USPQ2d at 1444. "[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." ***In re Lee***, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002).

When determining obviousness, "[t]he factual inquiry whether to combine references must be thorough and searching." ***Lee***, 277 F.3d at 1343, 61 USPQ2d at 1433, ***citing McGinley v. Franklin Sports, Inc.,*** 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001). "It must be based on objective evidence of record." ***Id.*** "Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'" ***In re Dembiczak***, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617. "Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of material fact." ***Dembiczak***, 175 F.3d at 999, 50 USPQ2d

at 1617, ***citing McElmurry v. Arkansas Power & Light Co.,*** 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993). The Federal Circuit states that, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In re Fritch,*** 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), citing ***In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). In addition, our reviewing court stated in ***Lee,*** 277 F.3d at 1343, 61 USPQ2d at 1433, that when making an obviousness rejection based on combination, "there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by Applicant" (quoting ***In re Dance***, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998).

The examiner asserts on page 4 of the answer that Fontenot et al. teach that the filters in the color wheel embodiment (figure 4) and the liquid crystal shutter embodiment (figure 6) transmit light in both the visible spectrum and infrared. On page 5 of the answer the examiner further states

> The knowledge within the ordinary skill in the art that color pass filters of the type that Fontenot *et al.*describes at page 18, lines 1-11, or a liquid crystal color shutter filter of the type that Fontenot *et al.* describes at page 21, line to page 22 line 5, do(es) not pass *color only* as asserted by Appellant but instead routinely pass(es) infrared radiation is long-standing. See Figs. 4, 5, and 6 of Yamakawa which show that color pass filters include significant infrared transmission. See also Fig. 5 of Dillon *et al.* which shows that color pass filters include significant infrared transmission. Sharp *et al.* confirms that a filter of the type illustrated by Fontenot *et al.* in fig. 6 would have significant transmission in the infrared even when combined (see Figs. 4 and 5). Accordingly, one of ordinary skill in the art

would have understood that the color filters in the wheel 54 used in the method of Fontenot *et al.*, or the color filters 83, 85, 87 in the liquid crystal filter color shutter used in the method if Fontenot *et al.*, passed both the color with which each is associated and infrared radiation and would still be fairly identified as color pass filters.

We disagree with the examiner's findings. We find that Fontenot et al. teach five embodiments and that in all five embodiments infrared (IR) light is blocked when visible light is presented to an image sensor. The first embodiment is shown in figure 1 of Fontenot makes use of a prism to split the beam of light to be captured by two CCDs and two filters are used, an infrared block filter, item 6a and a visible block filter item 14a, see pages 13 and 14. Fontenot's second embodiment, shown in figure 3, is a sequential embodiment which makes use of a slide with two filters on the slide a color pass filter item 36 and an infrared pass filter item 38. Fontenot's statement that on page 17, the "CCD has the infrared blocking filter omitted so that it is sensitive to infrared light energy which when the filter is 38 is depressed is passed to the CCD 32" clearly implies that infrared is only passed to the camera when the infrared filter 38 is present and is blocked by the color pass filter. Fontenot's third embodiment, depicted in figures 4 and 5 and described on pages 18 through 21, makes use of a filter wheel which has a color pass for each of the primary colors and an infrared pass filter, the description of this embodiment makes no mention of infrared light also being passed by the color pass filter. Fontenot's forth embodiment, shown in figure 6 and described on page 21, makes use of a series of LCD color filers. In relation to the LCD filters Fontenot states: "[w]hen energized it passes only the color for which it is designed." In

the fifth embodiment of Fontenot, shown in figure 7 and described on page 22, a prism is used to "separate visible light energy from infrared light energy". Thus, we find no support in Fontenot for the examiner's assertion that the color pass filters pass both visible and infrared light. We do note that Fontenot's description of several of the embodiments specifically state that only visible light is passed. As such, we find that Fontenot does not teach that there either an output, or a filtered transmission, or a signal which includes a component of visible and infrared light energies.

On page 7 of the answer, the examiner rebuts appellants' arguments that Fontenot's color filters do not pass infrared light, by stating, "Yes, Fontenot et al. is wrong when he describes that each LCD filter 'passes only the color for which it is designed' when energized." In the paragraph bridging pages 7 and 8 of the answer the examiner supports this assertion, rationalizing that for the LCD shutter to block infrared would require an additional filter which would destroy the function of the device.

This assertion by the examiner is unfounded by the evidence of record. Fontenot et al. states on page 9 line 21 that a Varispec ™ LCD filter can be used. Though the details of the Varispec ™ filter are not in evidence before us, on page 8 of the brief appellants admit that the Varispec ™ filter does not block infrared without modification. Appellants argue on page 8 of the brief and page 4 of the reply brief that the filter may easily be modified.

The examiner's statement bridging pages 7 and 8 of the answer does not dispute that a modification can be made but rather states that the modification would

"destroy the operation of the disclosed embodiment." The rationale provided by the examiner is that such a modification would require attaching an infrared filter with screws. Further, the examiner states, "there can be no suggestion of making the attached NIR-blocking filter movable … in view of the 'no-mechanical inertia' embodiment of Fig. 6."

The examiner's rationale of attaching an infrared filters with screws is speculative and is not supported by evidence on the record. Fontenot et al. disclose the Varispec ™ filter as used in conjunction with "the slide discussed above", see Fontenot et al. page 9 lines 12-21. This section refers to the slide of figure 3 embodiment, which contains a color pass filter, which as discussed above is considered to also function as an infrared blocking filter. We note, Fontenot's discussion of the Varispec ™ filter only mentions filtering red, green and blue, unlike the embodiment of figure 6 in which the LCD filter uses an infrared pass, red, green and blue. As such, we do not see Fontenot's discussion of the Varispec ™filter as directed to the embodiment of figure 6 but rather as a modification the embodiment shown in figure 3. Accordingly, we find that the Fontenot's disclosure of the use of a Varispec ™ filter does not contradict the teaching that the LCD filter in figure 6 "passes only the color for which it is designed", and thus we find that there is no teaching in Fontenot that the color pass filters pass infrared light.

Appellants argue on pages 8 and 9 of the brief, that Yamakawa and Dillon do not teach that the filters of Fontenot transmit both visible and infrared light.

In the examiner's statement of rejection, on page 5, of the answer, it appears that the examiner is presenting these references to show that color pass filters that transmit infrared are well known in the art. However, the examiner's rejection does not provide an explanation of why one of ordinary skill in the art would modify Fontenot to include the filters of Yamakawa and Dillon. As we stated above, we find no suggestion in Fontenot to use color pass filters pass infrared light.

Appellants assert on page 10 of the brief that there is no motivation to combine the references in the manner asserted by the examiner. On page 11 of the supplemental brief the appellants assert "Fontenot does not have a need for infrared subtraction from the visible light path. Fontenot filters unwanted infrared light from the visible light that illuminates the surgical site." Further, appellants argue that if Fontenot were combined with Morimoto it would be self defeating as "the whole purpose of Fontenot's system is to independently process an infrared signal for independent visualization of tissues surrounding a surgical site. Thus subtraction of infrared light from this signal is not desirable." We find these arguments convincing.

We find that Morimoto teaches an imaging system which does not use an infrared cut filter. The incoming light is split by a prism, and applied to two image pick up elements. The first image pick up element, item 4, is sensitive to both visible and infrared light, the second image pickup element, item 5 is only sensitive to infrared light, see page 5, paragraph 13, Morimoto. The outputs of the second image pickup element (the infrared signal) is then subtracted from the output first (the infrared + visible) signal

to produce a image signal which has the infrared component removed, see page 6, paragraph 15 of Morimoto. Morimoto teaches that the purpose of the subtraction step is to eliminate the infrared cut filter, see page 3, paragraph 6 of Morimoto. We note that Morimoto teaches that the two image pick up elements work simultaneously and not sequentially as is claimed.

As stated above, we find that Fontenot teaches that the color pass filters filter out infrared light, as such we find that there is no need to apply the infrared subtraction teaching of Morimoto.

We next consider the rejection of claims 17, 18, 20 through 24, 26, 27, 33, 34 and 37 through 39 as unpatentable under 35 U.S.C. § 103 as being unpatentable over Fontenot et al. in view of Yamakawa, Dillon, Sharp and Morimoto.

Appellants argue on page 1 of the reply brief that the issues for both rejections are the same.

As addressed each claim on appeal requires sequentially providing either an output, or filtered transmission, or signal which includes a component of visible and infrared light energies. It appears that the examiner is relying upon Sharp to teach a LCD shutter similar to that used by Fontenot in the embodiment of figure 6. On page 5 of the answer, the examiner states, in reference to the LCD embodiment of Fontenot et al. shown in figure 6, “Sharp et al. confirms that a filter of the type illustrated by Fontenot et al. in figure 6 would have significant transmission in the infrared even when combined (see figures 4 and 5).” However, the examiner’s rejection does not provide

an explanation of why one of ordinary skill in the art would modify Fontenot to include the filters of Sharp. As we stated above, we find no suggestion in Fontenot to use color pass filters that pass infrared light. Further, in reviewing figures 4 and 5 of Sharp we note that there is no data concerning the transmission of infrared light. The data points in these graphs do not show light beyond 700 nm in wavelength (red), infrared light has a wavelength above 800nm, see e.g. Yamakawa column 1, line 36. Thus the disclosure of Sharp does not support the examiner's assertion that Sharp teaches an LCD filter that passes infrared light.

In view of the forgoing, we reverse the rejection of claims 16–39 under 35 U.S.C. § 103.

Reversed

LEE E. BARRETT Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ROBERT NAPPI Administrative Patent Judge	)	

TIMOTHY N. TROP
TROP, PRUNER HU & HU, P.C.
8554 KATY FWY STE. 100
HOUSTON, TX 77024-1805